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THE
COMMONER ANIMAL PARASITES
OF THE SKIN,

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THE COMMONER ANIMAL PARASITES OF THE SKIN.* By A. H. OHMANN-DUMESNIL, St. Louis, Mo.

It has been my custom, when giving instructions in the diagnosis of diseases of the skin, to call the attention of students to one point in particular. Before mentioning this more definitely, I will premise by stating that a prominent subjective symptom is, beyond all doubt, itching. It is not only more annoying to the patient, but it also fosters the production of more or less destruction of the upper layers of the integument through the scratching which is indulged in to relieve the irritation. Itching is frequently the only symptom of the trouble, as is the case in pruritus, but the attempts to relieve this produce eruptions which only tend to obscure the diagnosis for those who are not well acquainted with the subject. In addition to this, there is a prevalent idea, that when a patient has an itching eruption, whether it be primary or secondary in character, it must necessarily be eczema, this misconception having originated from the dual fact that eczema is polymorphous in character, and prevails to a very large extent. Nor is this all. Another fallacy which is com-

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mon, and it has unfortunately been fostered by those who should know better, is that syphilitic eruptions never itch; when, as a matter of fact, they frequently do, when occurring in hairy portions. I have alluded to these two affections more particularly because they have an important bearing upon the subject I propose to discuss.

To return to my first proposition. The point to which I especially direct attention is this: Whenever a patient complains of itching of the integument, no matter where this may be felt, always begin your formulation of a diagnosis by a careful search for parasites, either vegetable or animal; and, in case such are found, immediately direct your therapeutic measures to the prompt destruction of these. For it is absolutely necessary to secure a disappearance of these irritants in order to obtain any satisfactory change in a cutaneous disease. Permit such active irritation to remain uncared-for, and it will increase in proportion to the increase in the number of parasites; and, as I will point out later on the multiplication in the case of animal forms, at least, is in a direct geometrical proportion explaining the oft-times almost remarkable multiplication of the little living pests which frequently cause, not only local discomfort, but may even directly endanger a human life through the causation of loss of sleep, the continued maintenance of nervous irritability and consequent derangement of all the functions of the economy leading to perverted nutrition, loss of tone, and susceptibility to general diseases and pathological conditions of a more or less grave nature. We have in addition to this the direct loss of blood occasioned by the withdrawal exercised by the predatory parasites, a source of debility which is added to by the artificial losses caused in the fruitless attempts of the patient to relieve the itching. We have still more to note in this direction—the destructive lesions which are produced in many instances suppurate, and in that manner not only produce a direct loss of tissue, but furthermore may bring mischief in the way of absorption of poisonous or effete products. Finally, the parasites themselves are but too frequently the carriers of micro-organisms, not only on the surface of their bodies, but in the proboscis. For it is a well-known fact, that they feed upon bacteria, and when they drive their delicate pumping apparatus into the skin, in their search for

blood, they propel an alkaline liquid which has the power of liquefying the blood, and thus they convey these organisms into the lymph spaces of their victims. My hearers may remember the report of a recent case of tuberculosis which was traced to bed-bugs, and they are also aware of the claims which have been made, with some show of justice, of mosquitoes being the active propagators of yellow fever.

I do not propose to speak of all the animal parasites which infest the skin, but I intend to take under consideration a few of those which are of more especial interest to the physician. To take a survey of all the animal parasites which irritate the skin would necessitate the compilation of a volume, and would moreover necessitate such a complete survey of the field as would hardly be justifiable under the circumstances. For this reason I will only take into consideration the *acarus scabiei*, the various pediculi, the *pulex irritans*, the *cimex lectularius*, the ixodes, and chicken louse. The rarer forms as well as those not so intimately connected with the lesions of the skin will not be considered, in order to keep this paper within the limits assigned to it by the time afforded in its reading.

In the consideration of each of these parasites I propose following a certain plan, which will be about as follows: The salient points of the eruption will be described, inclusive of the portions most frequently affected, followed by a notice of the habitat of the parasites. In conclusion, a description of this latter will be given, together with such information in regard to its natural history as will prove of service to the practitioner as well as of interest to the student. I do not propose to enter into any deep disquisition on the subject, but merely to give the more prominent facts in connection with the subject in the hope that they may, in some small measure, prove of service to those who may consult them.

In addition to the above, a few words on the treatment of the affections caused by the parasites, as well as the methods of destroying them and preventing their recurrence, will not be inappropriate and may, in some measure, also prove of service to those interested in the subject. With these few prefatory remarks, I will begin the consideration of each individual parasite which I have mentioned above.

SARCOPTES SCABIEI.

The eruption occasioned by this parasite is beyond doubt the most serious of all the animal parasitic dermatoses which I propose to take into consideration. Whilst limited in its area at its inception, it spreads very rapidly, chiefly through the efforts at scratching by the patient. The typical lesion which is characteristic of the presence of the parasite is a vesicle which is the abiding place of the female, which burrows under the horny layer of the epidermis, whereas the male limits his movements to the surface in search of the female. After fecundation, the female immediately tunnels underneath the upper layer of the skin for the purpose of depositing her ova, which mature as she pursues her way, so that by the time the eggs are laid the first one has already released its tenant. These furrows have the appearance of a small piece of black thread drawn under the skin, the dark appearance being caused by the deposits of excrement made by the female. Such a cuniculus is easily opened, and by the use of a proper magnifying glass the ova may be distinctly made out. The burrowing will easily explain the intense itching of the trouble as well as account for the fact that the flexures of joints, and those portions of the integument which are thinnest, are chosen for the purpose of laying eggs. Add to this the fact that contagion is the method of acquiring the trouble, no difficulty will be experienced in remembering the fact that the skin between the fingers and at the flexures of the wrists is that which is generally affected. The extension of the trouble is easy and secondary lesions soon appear after establishment of the trouble. The vesicles are torn open, the parasite released, the floor of the vesicle is torn as well as the cuniculus, pustules form, papules develop as a result of the lesion, crusts form here and there, and we have finally presented the picture of an inflammatory, polymorphous eruption of an exudative nature, in which the attacks of itching are irregular and intense. So far as the distribution of the lesions is concerned, one general rule may be formulated. The older the affection, the greater the dissemination. After it is once well established, the eruption is most marked in those portions which are most accessible to the scratching fingers. One of the most common accessory causes in the perpetuation of the trouble is filth. An unclean body necessitates scratching to loosen the accumulated epidermal scales and thus indirectly aids in the

further dissemination of the parasites. Filthy underwear forms a permanent depot for the sarcoptes to lodge in, besides acting as a preventive to the thorough action of any remedial measures which may be undertaken. Fortunately, the better conditions which prevail in this country have done much to lessen the number of cases which, to the uninitiated, is truly appalling in the large continental cities. Yet during the late civil war in the United States scabies was one of the curses with which both armies were afflicted. A peculiarity of scabies is that it does not affect the face or head.

The parasite which causes the disease is known as the sarcoptes scabiei. It was formerly called the acarus scabiei, from the fact that it belongs to the order acarina, family acaridæ, class arachnoidæ. It is a minute roundish animalcule barely visible to the naked eye, being equal in surface to the cross section of a small pin and pale yellowish in color. The female is much larger than the male, varying in length from $\frac{1}{4}$ ''' to $\frac{1}{5}$ ''' and in breadth from $\frac{1}{8}$ ''' to $\frac{1}{6}$ '''. The form is somewhat ovalish, the head being closely set to the body and also oval in form. There are no eyes. The thorax is provided with four short, jointed legs, terminating in suckers and bristles. The abdomen is likewise provided with similar legs of equal number. In the female the abdominal legs terminate in bristles, whereas in the male the last pair is also provided with suckers, the other two terminating in bristles. In the male we observe the external genital organ very plainly, whereas in the female there is a cleft visible at the abdominal extremity. When viewed upon its ventral surface there may be distinguished a number of cross striations which are undulating, and here and there small spinous processes from which bristles emerge. The head is provided with strong mandibles, and six hairs project from it. The habitat of the female is in the skin. As soon as it finds itself upon the integument, it begins burrowing to form a cuniculus wherein to lay its eggs. The male roams about on the surface looking for females to fecundate. The young are very hardy and develop very rapidly, the period of incubation varying from eight to ten days. With a little care the female sarcoptes can be extracted as well as the young in various stages. The male is more difficult to obtain, yet a little patient research will generally be rewarded by obtaining a specimen.

The treatment of scabies consists essentially in the destruction of the parasite which is the exciting cause of the trouble. A large number of methods have been successfully used to accomplish this purpose, and in such instance the thoroughness of application is the most essential part. From time immemorial the specific for scabies has been sulphur, and it has served a good purpose when properly applied. I do not propose to give all the methods employed, but will merely enumerate a few which are efficient. In Paris, where an enormous number of patients are treated daily at the Hôpital St. Louis, the patients are given a hot bath with frictions of black soap (*savon noir*) and well scrubbed. Then Wilkinson's ointment* is well rubbed in, and the clothing, which has previously been subjected to an intense heat in an oven, is resumed. One such treatment is sufficient. In Vienna the treatment is analagous. It is essential, however, that the ointment be well rubbed in. Another method consists in scrubbing the skin well with soap (*sapo viridis*) and water, and then rubbing in a sulphur ointment containing a drachm of the precipitated sulphur to the ounce of fresh lard. A method which is cleaner, and which I have successfully employed, is this: The patient takes a hot bath with some alkaline soap, in the morning, putting on a complete change of clothes. He then applies in the interval, *i. e.*, before assuming the change of clothing, and after thoroughly drying the skin, the following:

℞ Sodii hyphosulphit..... ʒ viij.
Aquæ destillat ʒ viij.

M.

After being applied it is permitted to dry on the skin, then the clothing is put on.

In the evening before retiring the following is applied:

℞ Acid. hydrochlorici dil..... ʒ vj.
Aquæ destillat..... ʒ iv.

M.

If it be too severe the acid may be further diluted so as not to prove too painful.

*Wilkinson's ointment as modified by Hebra is as follows:

℞ Sulfuris,
Ol. cadini āā ʒ ss.
Sapo viridis,
Adipis..... āā ʒ j.
Cretæ preparat. ʒ iiss

M.

The effect of this treatment is marked, and it possesses several advantages over other methods. It is cleanly in the first place. It is easy of application, and it ensures a precipitation of sulphur in an exceedingly divided state in every small fissure which may exist, thus making it as thorough as it is possible to do so. The process should be repeated daily for three or four days, not omitting the change of underwear and clothing. The clothes temporarily cast off should be subjected to a dry heat sufficiently intense to kill any lurking parasites, and yet not so high as to scorch the material. A little carefulness exercised in this matter will result in a satisfactory result, and no unnecessary expense will be incurred by the destruction of clothing. The point to be observed, however, is that whatever method be adopted make the applications thorough, and further eliminate all possible cause of infection.

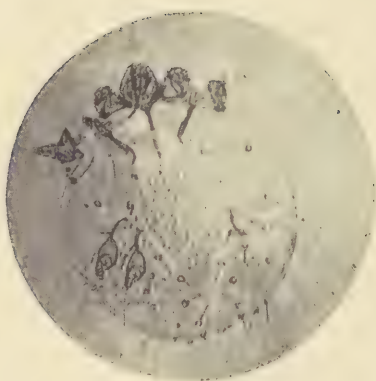
PEDICULUS CAPITIS.

Pediculosis or phthiriasis capitis is an affection which, whilst not common in this country, is seen sufficiently often to attract more than passing attention. In Europe it is much more frequent in occurrence, and there, as here, it is among the poorer classes, and those who are strangers to cleanliness, that it is more frequently observed. A little care in making an examination will enable a diagnosis to be easily reached by the fact that the parasite is easily seen, as well as its ova. In a mild case of the trouble the patient complains of itching in the scalp, and this sensation is not confined to any one point, but seems to be changing its location continually, occasionally occurring in several points at one and the same time. Scratching of a mild character momentarily relieves the pruritus. The hairy scalp alone is affected, the parasites confining themselves to this area. To find the little pests it is necessary to part the hair, as they limit their roamings to the integumentary surface, as a general thing. Upon the hairs will be found "nits" or ova tightly glued to the shaft, and presenting the appearance of minute white bodies or apparent nodes. Should the condition have existed some time the multiplication of the pediculi has been so great, and the consequent irritation so marked, that scratching is more severe, and as a natural consequence, a dermatitis more or less severe in character is set up. Papules, pustules, crusts and excoriations exist in various proportions accompanied by a glairy exudation which

tends to mat the hair. Fermentative changes set in, and are attended by a disagreeable foetid odor of a more or less sour smell. Add to this the accumulation of extraneous matter and the condition of extreme filth which is presented can be better imagined than described. As a result of scratching low down on the occiput we have the pruritus extended some distance down the neck, and the efforts made to relieve this produce excoriations and crusts of a dirty color, the condition being known as *porrigo pediculis*. The site of predilection of *pediculi capitis* is the occiput, the vertex, the temples also being favored spots. Whilst more frequently observed in those having long hair, it is also often observed in those who keep their hair trimmed short. It is seen at all ages, and may be easily acquired by those of cleanly habits who may come in contact with the persons, clothing or bedding of patients having *pediculosis*. Street cars, railway carriages, cabs, and other conveyances are a frequent source of contamination.

The *pediculus capitis* or head louse is grayish in color, of an elongated ovalish form. The female is somewhat larger than the male, the sizes varying from $\frac{2}{3}$ " to $1\frac{1}{2}$ " in length, and about one-half of this in breadth. The head is somewhat acorn-shaped, provided with distinct eyes and five-jointed antennæ. The legs, which are attached to the thorax, are provided with four joints exclusive of the claw with which each one terminates. The legs and body are provided with hairs which are quite distinct. Strong mandibles exist, and enable the parasite to traverse through the stratum corneum of the skin down to the rete malpighii from which it can derive its sustenance in the form of blood. The habitat of the *pediculus capitis* is on the scalp; the female, however, being frequently found upon the hairs where it goes to deposit its ova for incubation. The ovum or "nit" is a whitish, oval or pyriform body about $\frac{1}{4}$ " in length, and is distinctly visible. It is attached to the hair by a peculiar glutinous substance. One or more ova may be attached to the same hair. The incubation period varies from six days to a week, and the females are very prolific being almost continually occupied laying eggs. It may be readily seen how an enormous multiplication of the parasite is possible in a comparatively short space of time.

The treatment of *pediculosis capitis* must not only be curative, but prophylactic. In order to obtain a permanent release from



Sarcoptes Scabiei.



Pediculus Capitis.

the pests it is absolutely necessary to remove all causes of possible contagion. In order to ensure this, individuals similarly affected should be avoided, and all head coverings subjected to a process which will effectually destroy the parasites and their ova. Combs and hair brushes should likewise be thoroughly cleansed after each time they are employed, and no other individual should be permitted to use them any more than hats, caps, or similar articles of dress. In the case of males affected with pediculi of the head, the treatment is comparatively a simple matter, as the hair may be clipped very close thus affording an opportunity of making applications more thoroughly. All ointments should be avoided, as they are disagreeable to use, whereas liquid preparations are more agreeable and cleanly. I have found one of the best remedies to employ for this purpose in campho-phenique which not only kills the parasite and destroys the ova rapidly, but has the further effect of acting as a vulnerary on the secondary lesions which have been caused by scratching. It may be used two or three times daily on the dry scalp. In the case of females with long hair we have a more complicated condition of affairs to deal with. The hairs are frequently full of ova, and these must be eliminated *pari passu* with the destruction of the pediculi. For this purpose a thorough shampoo with *sapo viridis* is unexcelled as it dissolves the nits and cleanses the hair. When the hair and the scalp have been thoroughly dried the same remedy as mentioned above may be used. A preparation which has met with success in Russia, not only in pediculosis, but scabies as well, is the thorough use of benzine. Its disagreeable odor, however, will always limit its use. The remedies which have been successfully used in pediculosis are numerous, and all have been highly lauded. A solution of bichloride of mercury varying in strength from 1 to 1000 to 1 to 5000 is well spoken of, also an infusion of *staphisagria* thoroughly applied. The use of coal-oil is popular with the lower classes, but is often followed by a marked dermatitis frequently of an eczematous character. Solution of creolin, of the strength of eight per cent. is claimed to be efficient. A six per cent. solution of carbolic acid is an effective lotion in pediculosis, but it generally permits the ova to hatch, and a new crop of parasites to appear. The principal point to observe, no matter what measures be adopted, is that the treatment be thorough, and this implies not only the

application of the remedy to the affected parts so as to reach every point, but also a frequency sufficient to accomplish the purpose completely, and not such as will permit of relapses through the hatching of the undestroyed ova.

PEDICULUS CORPORIS.

Pediculosis corporis is an affection which is produced by the pediculus corporis *seu vestimenti*. It is common enough to be seen under circumstances in which masses of individuals congregate, and have no opportunities or inclinations to keep themselves clean. Soldiers who are any length of time in camp, laborers who live in camps, several occupying one tent, the dwellers of tenement houses of the lower class, and similar individuals seem to be infested with the body louse. As a rule, it is adults who are most subject to the trouble, and men more frequently than women. The itching which is present is intolerable, and is most severe about the shoulders and sides of the body, although the limbs and trunks are often the seat of pruritus. The head is never attacked, and this will be immediately explained when we consider that the habitat of the pediculus corporis is the clothing and not the integument. The lesions presented upon the body are almost pathognomic of the trouble, and, when found, should always lead to a careful examination of the clothing worn next to the skin. The objective phenomena which are seen consist of secondary lesions, and these are, for the most part, excoriations of a marked character four to six inches in length, and several in number parallel to each other. They are the result of scratching, and to be found in those portions most accessible to the hands, viz., the scapular regions, the flanks, the buttocks, the outer surfaces of the thighs, etc. The scratching, at times, is so severe as to produce bleeding and consequent crusts. If the trouble be superficial, ulcers will form. The underwear will stick to the denuded patches, and its removal will lead to fresh bleedings accompanied by pain. When a case has progressed thus far the arms will share in the general involvement, and the spectacle presented by a patient thus affected is that of a most miserable being.

Among the modifications observed in the subjective symptoms occurring in pediculosis corporis is the presence of short and jagged scratch marks, due to digging of the nails into the integument. Another condition is seen which should not be hastily

misjudged. This consists of pigmentation of a light or dark brown color, at first disseminated in macules of varying size. In cases of long standing it may become diffuse and involve the entire integument which has been subjected to the depredation of the parasite.

The pediculus corporis is the largest of the pediculi. It sometimes attains comparatively enormous proportions and is quite voracious, abstracting the blood of its host quite freely and in amounts that are comparatively large. It is stoutly built, the female being considerably larger than the male. It varies in size from $\frac{3}{4}$ " to 2" in length, being about one-third as broad. In color it is a dirty-gray which has a reddish tinge after it has abstracted blood. The female is much broader at the abdomen on account of the ova which it must contain. It may be distinguished from the male by the notch which exists at the distal end of the abdomen. This parasite is provided with three strong four-jointed legs, having claws at their extremities and provided with hairs. The abdomen has seven well-defined notches on each side. The head is large and somewhat acorn-shaped, the eyes being quite prominent. The antennae which are strong, are five-jointed and very mobile. The mandibles are unusually powerful and easily cut the integument of the host. As mentioned above, the parasites live in the seams of the clothing and it is here that the female deposits her ova which hatch in five or six days. It is said that in eighteen days they will reproduce. When the parasite desires food it will roam on the skin, and it is on this account that very few are ever found outside the clothing.

The treatment of this condition is very simple in principle, but it is not such an easy matter to carry out in actual practice. It is to be divided into two parts—the treatment of the patient and that of his clothing. A good bath and destruction of the clothing is certainly not difficult to order, but it cannot be carried out in many instances. What can be done, however, and if it be done thoroughly it will result in success, is to adapt the means to be used to the conditions presented. The treatment of the patient should consist in the application of campho-phenique to the entire affected surface. This remedy kills whatever parasites may be lurking on the skin, and it acts as an antiseptic and vulnerary, promoting a rapid healing of the dermatitis which has been excited by the scratching. Washing

thoroughly with a slightly alkaline soap and then applying a 1 to 1000 solution of bichloride of mercury is also a good plan. No method, however, will be effective unless uninfected clothing be assumed after its use. If, as it often happens, the patient has no change of clothing, the parasites must be picked out of the garments and killed, a matter which is easy, as they are found with but little trouble. To insure the destruction of the ova it is absolutely necessary to subject the clothing to a high degree of heat. It is better after this to soak it in a fairly strong alkaline solution and boil it and then thoroughly wash it. Such a course will rid the patient of these parasites; but, unless he avoids those persons or localities where body lice flourish, he will acquire them again. They may be picked up occasionally, as in the case of head lice, in public conveyances, sleeping cars, unclean hotels; or, in fact, wherever perfect cleanliness does not reign, and where all sorts and conditions of individuals may congregate, or occupy furniture which will be occupied by others.

PEDICULUS PUBIS.

Pediculosis pubis is an affection much more commonly encountered in males than in females. It manifests itself by an intense itching about the mons veneris, which scratching does not seem to allay by any means. Beginning with fugitive sensations of pruritus, the symptom after some time becomes incessant and well nigh intolerable. Should the symptom be permitted to go on untreated for a protracted length of time the itching ceases entirely or almost so, although the parasite will continue increasing its numbers. It is not entirely limited to the pubic region. It may occur wherever there are coarse or stout hairs and it may affect individuals at all ages, from infancy to old age. It is not infrequently found about the hairs of the legs, if these be at all coarser than the ordinary human hairs. The hair of the chest and of the axillæ also afford a convenient nidus for the parasite. The beard is occasionally seen to harbor it as well as the eyebrows and eyelashes. But here it stops. The scalp is never affected*, as the hair of the head is doubtless too fine to afford the grasp which doubtless the parasite needs. So far as second-

* In Nov. 1892, Roma presented a known exception. In the case of a boy of 14 who presented pediculi and their ova on the head, neck, eyebrows and eyelashes. The migrations of all the forms of pediculi have been mentioned by several authors, but they are the exception rather than the rule.

any symptoms are concerned we find little or any occurring except in the axillæ and eyelids. In the former excoriations and polymorphous eruptions occur; whereas, in the latter, a condition resembling tinea tarsi is developed as a result of the rubbing occasioned by irritation. Bluish macules are sometimes seen upon the anterior and upper portions of the thighs, due to the bites of the pediculi. These *taches bleuâtres*, as they have been denominated, are pathognomic of pediculi pubis and are supposed to be due to a fluid ejected by the parasites when they prepare to exercise their depleting power. The macules disappear spontaneously and seem to occasion no subjective symptoms whatever in the patient beyond more or less fright at their apparently sudden appearance.

The pediculus or phthirius pubis,* or as it is commonly known, "the crab-louse," is of a light-greyish color almost translucent at times. Size of the pediculi vary from $\frac{1}{2}$ " to 1". The thorax is almost imperceptible, the form depending more upon that of the abdomen which has been very aptly denominated shield-shaped. It is provided with small eyes which show up quite distinctly. The antennæ are rather long and five jointed. There exist six four-jointed legs, the two last of which are provided with large, strong claws bearing a close resemblance to those of the lobster. These claws are so muscular, that in efforts to dislodge the parasite from a hair the hair itself is frequently pulled out. In addition to the legs which have been described, there exist eight teat-like projections in the sides of the abdomen, these being prehensile feet provided each with four to ten hairs. The female, as is usual in this family of parasites, has a notch at the extremity of the abdomen. Reproduction is very rapid, the ova being hatched out in six to eight days. The ova are goblet-shaped and so strongly attached to the hairs, that after hatching the shells will remain in situ. These are more or less translucent and exist along the shaft of the hair in varying numbers. The difficulty of dislodging them is frequently a cause of relapses so frequently seen in the affection. The grown specimens are unusually voracious in their habits and endowed with more than ordinary vitality. They lie flat against the skin with great tenacity, by means of the four pairs of short feet with which they are provided, and being very

*Among the names applied to this parasite may be mentioned phthirius inguinalis, phthirius pubis, and morpio.

pale in color they frequently escape detection and must be literally scraped off in order to be distinctly seen. When in search of food they range about, most generally through the medium of hairs, although the clothing also acts as a carrier and transports them quite some distance from their original habitat. Occasionally ova are directly transplanted to new quarters by means of the finger nails.

The treatment of pediculosis pubis is not always as easy as some would have us fondly imagine. When the trouble is confined to the pubic region it is not difficult to obtain a successful result; but when it has been disseminated over broad areas it requires care and attention to completely eradicate the little pests. The best method of treating the condition when it affects the eyebrows and eyelashes is to remove the pediculi and their ova with fine forceps. It is not a difficult thing to do and is always radical in its results.

As they are never present in great numbers, very little time is required, and all that is necessary may be done in one short sitting. So far as other parts of the body are concerned, any one of a number of methods may be successfully employed. A method which is very popular, but which is not only filthy but very frequently liable to bring on untoward effects, is the use of mercurial ointment. Other ointments are equally disagreeable to use and should be discarded in view of the fact that more cleanly and agreeable methods are always at hand. Lotions are certainly more desirable, but thoroughness should be observed in their use, not only for each application but for the length of time they are applied. They should be used twice a day for not less than eight days, as this will ensure the destruction of whatever parasites which may have been hatched out during this interval and will furthermore prevent the breeding of a new generation. An easily procurable lotion is a six per cent. aqueous lotion of carbolic acid. One which is of value when no excoriations exist is composed as follows:

Rx. Hydrag. bichlorid.....gr. iv.
Aceti aromatic.....3̄vj.

M.

When excoriations or other secondary lesions exist, however, it has been my custom to employ campho-phenique, as it is not only an efficient parasiticide but it also acts beneficially as an antiseptic,

procuring a rapid resolution of the artificial inflammatory process and is unaccompanied by any danger of producing toxic symptoms. Moreover, it acts as an antipruritic and thus fulfills the requirements of an ideal remedy in this condition.

PULEX IRRITANS.

The cutaneous trouble occasioned by the *pulex irritans* or common flea is one which frequently gives rise to groundless fears and alarms. The lesions which appear as results of the bites of this parasite are erythematous in character, a number of them appearing like roseola and liable to be mistaken for measles. The lesions may be discrete and few in number or there may be many of them distributed over comparatively a large area of the integument. At the time the flea bites there is a sharp stinging sensation, which gives way in a comparatively short space of time to burning and itching of a rather severe character. If the lesions be numerous these subjective sensations are intensified in character, and the efforts made to subdue them will result in secondary lesions. The diagnosis is not a difficult one to make if the lesions be closely examined. No matter what secondary lesions are present, the primary macules will always exist here and there. Each one of these has a central punctum which is minute in size and darker in color, besides being generally elevated above the general surface of the macule. It is due to a hæmorrhage and the small clot of blood can be distinctly made out with the help of a magnifying glass and can be even removed with the point of a needle. This will serve to distinguish the eruption from the different forms of roseola. Whilst fleas are not essentially human parasites, they seem to have a fondness to adopt the human body for a host, and although not frequently seen in this country they are common enough in the rural districts of Europe, where dogs, cats and human beings herd together in small, close, filthy quarters.

The *pulex irritans* is quite familiar to all who have ever owned cats or dogs. It possesses a large abdomen, small thorax and roundish head provided with small eyes. It is a light brown in color when mounted, but as found when living it is of a marked dark brown and very glossy in appearance. It varies in length from $\frac{7}{8}$ ''' to $1\frac{1}{2}$ '''. It has well marked five-jointed antennæ and is provided with six legs. These latter organs are peculiar in that

they are three-jointed, the last joint, however, being terminated by a toe which has five joints and which itself terminates in two claws. This last toe and joint are well provided with bristles, located on the posterior surface. The last pair of legs are much longer and stronger than the two anterior pairs and they are very powerful and muscular, thus enabling the animal to leap and project itself through comparatively long distances. Again, we find that the three pairs of legs are much crowded anteriorly, but folding in such a manner that when the flea is at rest the abdomen is apparently held midway. The animal is quick of movement, not only when it is hopping but also when it is running, which it does upon the slightest indication of danger or disturbance. Its favorite roaming ground is close to the skin, in animals, where it is buried in the thick growth of fine hair. Here it is that it performs its depredations, preferring those regions where the skin is thin, such as at the flexures of the joints. When it attacks the human it generally seeks those regions which are covered by clothing and warm, and never attacks the scalp. The neck is frequently sought by them, in men, perhaps on account of the attraction furnished by the white color of the collar. The *pulex irritans* breeds very rapidly and, so far as I have been able to determine, it deposits its eggs on the skin and they hatch out in about a week.

The treatment of flea-bites is perhaps not so important as the adoption of prophylactic measures. For the former a number of adequate applications may be used, and one of the best perhaps is an aqueous solution of some antipruritic such as the following:

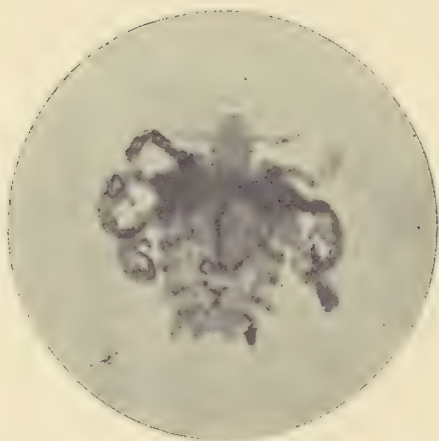
Rx.	Hydraggyri bichloridi.....	gr. ij.
	Ammon. Muriat	gr. iv.
	Acid. carbolici.....	3 ij.
	Glycerini.....	3 ij.
	Aqæ rosæ.....	q. s. ad. 3 vj.

M.

This should be applied several times in the day and a quick recovery will result. But it will scarcely prove efficient unless the skin is freed from the little pest which causes the trouble. To accomplish this the clothing should be carefully removed and exposed to the air, and a carefulness exercised that the fleas will not leap into other articles of clothing. If there be pets about the house see to it that the cats and dogs are freed from parasites, and if they have been acquired from strange animals, avoid them



Pediculus Corporis.



Pediculus Pubis.

in the future. To keep animals free from fleas is a most difficult matter, but the parasites may be killed by rubbing in well some pyrethrum powder, which destroys them and is not noxious to the host. Bathing dogs with carbolic soap will rid them of fleas if care be taken to submerge them completely so that the parasites will be carried off in the water. But I do not desire to enter into the subject beyond calling attention to the fact that many cases of flea-bites occur in patients in which the diagnosis must be made from the lesions, as the parasite has long since betaken itself to new fields and cannot be found. It is for this reason that great care should be taken not to mistake flea bites for exanthematous troubles, and vice versa.

CIMEX LECTULARIUS.

The *cimex lectularius* or "bed bug" is almost universally disseminated, and occasions lesions which give rise to considerable alarm, and which are frequently wrongly interpreted, this being one of their peculiarities. The parasite occasions much discomfort by its bite, and it requires a certain amount of attention to make a proper discrimination. The most severe lesions are found in those who have the most tender skins, and the subjective symptoms also vary in proportion to this factor. In infants and children, more especially, the lesions are apt to take on an inflammatory appearance, whereas in adults who have particularly resisting integuments scarcely any perceptible objective symptom is to be seen. On the other hand, those whose skins are most susceptible are conscious of a sharp pain with a slight dull aching sensation following, the pruritus not being so severe as those whose epidermis is thick, and in whom the itching occasioned by the bite of the parasite is intolerable. The particular lesion caused is a small circumscribed œdema with a minute central punctum, which is hæmorrhagic. The lesions are of the size of the small finger nail or even smaller, and resemble the wheals of urticaria with the exception of the outer erythematous zone. In the bite of the bed-bug they are white, and furthermore are more persistent. In any case, the pruritus excited lends to the formation of secondary lesions brought on by the scratching. Any portion of the body may be the seat of the eruption, although, as a general rule, the hands, wrists, feet, ankles and face are those most frequently involved, as they are the most accessible locali-

ties. It is no uncommon thing to be awakened out of a sound sleep by a pruritus of such an intense nature as to deprive the subject of rest, and a close inspection will reveal a cimex as the cause of the trouble. The constant subjection to the irritation nightly is very apt to bring on a train of nervous symptoms, and reflex excitability which may be incorrectly interpreted unless the true cause be discovered.

The cimex lectularius, acanthia lectularia, or common bed-bug, is probably one of the best known animal parasites which attacks the human being. Its geographical distribution is almost universal, the varieties found in the tropics being much larger than those encountered in temperate zones. When fasting the cimex is flat, of a yellowish-red color, and varying in length from 1''' to 2'''. When glutted with blood it has a distinct red color, and is appreciably enlarged by the blood which it contains. It is unusually tenacious of life, being able to exist for protracted periods of time without food. When it has an opportunity, however, it is gluttonous. It has a penetrating odor, disagreeable in the extreme, although compared to cinnamon by some. The parasite has a large abdomen, a small thorax, and a diamond-shaped head, the eyes being fairly large and prominent: two antennae, which are four-jointed and very mobile, project anteriorly. There exist three pairs of legs, three-jointed in character, and terminating in a single claw. The body is provided with a number of bristles, none, however, being perceptible on the legs. The female proliferates not only frequently, but large broods are the result. The young as soon as hatched begin their depredations, and as they are often not larger than a very small pin's head they frequently escape detection, although the odor reveals their presence. The habitat of the bed-bug is in the cracks of the wood of bedsteads, in the bed-clothes, under wall-paper, in old books, in fact wherever a small chink or crack can afford them a hiding place. They are not infrequently found in the clothing, having wandered there from the cracks of clothes-presses or wardrobes. As a rule, the bed-bug attacks his host when the latter is asleep, and the attacks of the parasite are always fierce. The irritation produced is not only caused by the direct wound inflicted, but by the injection of an acid fluid which is intended to prevent the coagulation of the blood as it is drawn. It is for this reason that micro-organisms are apt to be injected by the parasite into

lymphatic spaces, and thus infection be produced without any very clear cause for it.

The treatment for the cutaneous trouble caused by the cimex is usually a simple one so far as allaying the symptoms is concerned. Dilute alkadies, vinegar, alcohol, whisky, etc., are the more commonly recognized domestic remedies. It is best, however, to use a dilute solution of bichloride of mercury, as it will not only cause the disappearance of the symptoms, but will act as an antiseptic, and prevent any possible phlegmonous complications. Campho-phenique will do the same thing, and possesses an added advantage in being an anæsthetic. Treatment may be deemed superfluous when one or two small lesions exist, but when an infant is affected from head to foot it becomes a matter of some moment, as the result of such an extensive cutaneous irritation may take on a serious character. It is also for this reason that care should be exercised not to mistake the trouble for irritation or some exanthem. The principle thing to do, however, is to get rid of the "bugs." This is not such an easy matter as it might seem, as every housekeeper will testify to. To rid furniture of bed-bugs is possibly yet a problem, for the females deposit their ova in minute cracks which are difficult to reach with parasiticides. Mercurial preparations are probably the best for this purpose, and yet they are fraught with some danger to those sleeping in the bed so treated. Moreover, whilst the bedstead may be clean the seams of the mattresses will be found teeming with these pests, and a thorough and careful search for, and destruction of them seems to be an almost hopeless and interminable piece of work. The only thorough method, perhaps, is to have everything new, and to live in quarters free of the cimex.

DERMANYSSUS AVIUM.

The eruption caused by this parasite is rarely, if ever, seen in cities, although it is not of unusual occurrence in the country. It produces an eruption most often upon the dorsum of the hands, about the wrists and forearms, although other portions of the body are liable to be attacked. The attack generally begins with itching, which is soon followed by an eruption more or less diffused, and which may be erythematous and papular, or mixed, vesicles and wheals making their appearance. It is seen in those who come in contact with domestic fowls, and the parasite is

ordinarily derived from the chicken-house. The trouble is often very annoying, and aggravation is by no means uncommon from repeated exposure to the cause. Women and children suffer more severely from this cause than men on account of the greater delicacy of their skin. The peculiar localization of the eruption, together with its strict limitation, should immediately arouse suspicion, more especially when observed in those whose duties cause them to frequent chicken-houses or aviaries.

The *dermanyssus avium*, or chicken louse, as it is more commonly known, is a familiar parasite to those who raise chickens, and it is an enemy whose destruction is constantly sought on account of its fatal effects on poultry. It is about 1" long and perhaps one-third as broad. It is rather pale in color. Its abdomen is quite long in proportion to the entire body and its head is somewhat mushroom-shaped and provided with two rather small but distinct eyes. It has no antennæ, but is provided with powerful mandibles. It has three pairs of three-jointed legs which, like the body, are not provided with bristles. This parasite is very prolific and voracious, attacking not only common fowl but pigeons and other domesticated birds, and extending its depredations even to quadrupeds. It is chiefly found in the wood-work of houses, where it issues at night to feast upon the sleeping fowl. A number, however, will remain on their host, and it is chiefly in the flexures of the joints and upon the neck that they are to be found. Young birds will not infrequently die of the exhaustion induced from the drain of blood, and the older ones become emaciated.

The treatment of the eruption caused by the chicken louse is a very simple one, consisting of the application of a three per cent. solution of carbolic acid, which rapidly allays all the symptoms. To prevent recurrences the infested chickens and their quarters should be avoided. If this avoidance cannot be effected, attention should then be turned to the fowl and their habitation. For the former the use of carbolized oil, pyrethrum powder or dilute oil of orris will effectually rid them of the parasites. The building in which they are kept can be rid of the parasites by washing with a solution of some strong alkali, such as common lye, and it is better, after this has been done, to thoroughly whitewash the structure within and without, having previously isolated the fowl and destroyed their parasites. Occasionally in the human



Pediculus Pubis, emerging from Ovum.



Pulex Irritans.

the parasite will be found upon the skin, but it does not seem to thrive upon the integument of man and it quickly disappears.

IXODES AMERICANUS.

The lesions occasioned by this parasite are of the most acute character and may result quite seriously. The subjective sensations are of a painful, burning nature, whilst the lesions are of an inflammatory character. When observed it will seem as if the parasite is embedded in the skin, and surrounding the part in which it is buried there is a bright red areola with occasionally a small wheal. If the parasite is torn away a portion remains behind and a slight phlegmonous process results, generally leading to suppuration and final resolution. The genital region seems to be particularly affected, although the lower limbs are also attacked to quite a considerable degree. The trunk and upper extremities are also subject to the depredations of this troublesome parasite. Males are more subject than females on account of their outdoor life and occupations.

The *Ixodes Americanus* (*amblyoma Americanum*) or wood-tick, as it is ordinarily known, is about the size of the *cimex lectularius* and has the same general form. It is red in color and has a rather small head and distinct, small eyes. The variety most commonly encountered has a white spot situated about the center of the back. It is provided with three pairs of three-jointed legs provided with a single claw. The most prominent feature is the powerful suction apparatus which it possesses. This consists of three divergent, sharp, trunks, which are brought close together, driven into the skin, and then separated, thus giving a hold which will not relax. The efforts made to remove the tick result in tearing off the body, and thus leaving the embedded portion to act as a foreign body on the skin. The tick does not limit its depredations to the human being, but attacks all quadrupeds upon whom it can secure a hold. It seems to be most plentiful in dead leaves, rotten wood, and vegetable matter undergoing dry decay. It is quite prolific, and individuals travel together in great numbers, so that is not rare for several hundred to fasten themselves upon one host. So far as the treatment of the condition caused by this parasite is concerned, it is a very simple matter. To get rid of the parasites it is merely necessary to apply olive oil liberally wherever they are to be

found. The action of the oil is two-fold—it causes the ticks to fall out and acts as a soothing remedy to the wounds they have produced. If they have already been torn off, a mixture of equal parts of olive oil and campho-phenique will act very satisfactorily; so will carbolized oil of a strength of about two per cent. As regards prophylaxis, it is well nigh impossible to attain. Oil of pennyroyal and other essential oils will not prevent ticks from attacking the skin. It may keep off a certain number, but individuals are so voracious that after a tramp through the woods they will be found and their locality will not be difficult to establish. The only prophylactic that is certain is to avoid the localities where they hold forth.

I do not propose delaying with any more parasites of an animal nature which infest the human skin. This would be an almost endless task, as the list is very large. A few which might be mentioned are the chigoe or chigger, the *leptus autumnalis*, the *filaria Medinensis* or guinea-worm, the screw-worm, etc. The tropics have their peculiar animal parasites, which are numerous and produce serious lesions, so serious that they even may be fatal in their effects. Suffice it to say, that those which I have given are the ones most commonly met with in our latitudes, and sufficiently numerous to satisfy any ordinary demand in that direction.

For the benefit of those who may be desirous of prosecuting their studies still further in this direction, I append a list of a few monographs devoted to the subject of animal parasites which infest the skin.

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This embraces but a very small proportion of the books and monographs devoted to single animal parasites or to the entire subject, but it is sufficiently extensive for all practical purposes.

Before concluding, I desire to express my thanks to Dr. A. S. Barnes, Jr., for help in making some of the microphotographs appended to this article.

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Cimex Lectularius.



Chicken Louse.

